

## CLAIMS

1. A method for producing a single crystal by Czochralski method with pulling a seed crystal from a raw material melt, wherein when a pulling rate of pulling a single crystal is defined as  $V$  (mm/min), a temperature gradient at a solid-liquid interface is defined as  $G$  (K/mm) and a highest temperature at an interface between a crucible and a raw material melt is defined as  $T_{\max}$  ( $^{\circ}\text{C}$ ), at least, a range of a value of  $V/G$  ( $\text{mm}^2/\text{K} \cdot \text{min}$ ) including a desired defect region and/or a desired defect-free region is determined according to the  $T_{\max}$  ( $^{\circ}\text{C}$ ), and the single crystal is pulled with controlling a value of  $V/G$  ( $\text{mm}^2/\text{K} \cdot \text{min}$ ) within the determined range.

2. The method for producing a single crystal according to Claim 1, wherein the single crystal is pulled with controlling the value of  $V/G$  ( $\text{mm}^2/\text{K} \cdot \text{min}$ ) in a range from  $-0.000724 \times T_{\max} + 1.31$  to less than  $-0.000724 \times T_{\max} + 1.38$ .

3. The method for producing a single crystal according to Claim 1, wherein the single crystal is pulled with controlling the value of  $V/G$  ( $\text{mm}^2/\text{K} \cdot \text{min}$ ) in a range of  $-0.000724 \times T_{\max} + 1.38$  or more.

4. The method for producing a single crystal according to Claim 1, wherein the single crystal is pulled with controlling the value of  $V/G$  ( $\text{mm}^2/\text{K} \cdot \text{min}$ ) in a range from  $-0.000724 \times T_{\text{max}} + 1.31$  to  $-0.000724 \times T_{\text{max}} + 1.35$ .

5. The method for producing a single crystal according to any one of Claims 1 - 4, wherein the single crystal is pulled with the  $T_{\text{max}}$  ( $^{\circ}\text{C}$ ) being in a range of  $1560^{\circ}\text{C}$  or less.

6. The method for producing a single crystal according to any one of Claims 1 - 5, wherein, at least, the  $T_{\text{max}}$  ( $^{\circ}\text{C}$ ) is changed by providing a heat insulating material between the crucible containing the raw material melt and a heater provided so as to surround the crucible, or by providing a heat insulating material below the crucible.

7. The method of producing a single crystal according to any one of Claims 1 - 6, wherein a silicon single crystal is pulled as the single crystal.

8. The method of producing a single crystal according to any one of Claims 1 - 7, wherein a single crystal with a diameter of 200mm or more is pulled

as the single crystal.

9. A single crystal produced by any one of methods according to Claims 1 - 8.